

ART. XI.—*The Rotifera of Australia and their Distribution.*

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Investigation into the Rotiferon Fauna of Australia has so far been carried on by but few observers, but at widely separated points. The neighbourhood of Melbourne has probably received most attention. About Sydney, Brisbane and Adelaide collecting has been done, and outside these capitals scattered districts in Victoria and New South Wales have been worked, the most remote contribution being a colonial form obtained by Sir Baldwin Spencer when with the Horne Expedition to Central Australia.

It is quite true that the number of species of rotifers attributed to any country are so far proportionate to the amount of search that has gone on. It appears that much more work should be done before a full comparison can be made with the rotiferon fauna of other countries.

The time when an extensive investigation into this group of animals will be completed appears so remote that it may be useful to report progress in the hope that further enquiry may be stimulated. Adhesion to the classification of Hudson and Gosse, as the generally accepted one up to the present, seems desirable in spite of a recent proposed alteration. It may be well to point out that a departure from this system and of the accompanying understanding not to go back beyond Ehrenberg in the search for priority, will certainly retard work in this group in the outlying parts of the world, although such course may be in accordance with a strict interpretation of the rules relating to priority of names.

The records which may be regarded as reliable give a result in numbers as follows:—

Rhizota .. . . .	39	species	of	9	genera.
Bdelloida .. . . .	54	„	„	16	„
Ploima—					
Fam. Illoricata .. . . .	57	„	„	17	„
„ Loricata .. . . .	79	„	„	19	„
Scirtopoda .. . . .	1	„	„	1	genus.

In all there are 230 species.

Many more species have been seen, but the above can be regarded as the total number of certain identifications, and is the work of some seven or eight observers.

The habitat and occurrence of rotifers in Australia present features differing from those of Europe and America. The dryness of the country in the summer months obliterates nearly all the pools in the early spring, so that the summer is the quiescent period for rotifers. The so-called "winter egg" which in Europe carries the species over the cold season is here a "resting egg" bridging over the warm weather. In the district south of Melbourne, known to botanists as the "heath country," there is an area with a surface largely formed of blown sand, in the hollows of which numbers of pools exist in winter and disappear entirely every summer, yet they yield a varied collection of these animals. Among the forms occurring in this way are a few species of unique characteristics which so far are unknown elsewhere. These all belong to the genus *Lacinularia*.

In the main part of Hudson and Gosse's "Rotifera" only one species of this genus was mentioned—*L. socialis*, a world-wide form—and in the supplement to the work there was a brief description of *L. pedunculata*, an Australian animal. Since the appearance of that work, eight more species of *Lacinularia* have been described, and of these seven, *L. elliptica*, *L. elongata*, *L. megalotrocha*, *L. pedunculata*, *L. racemovata*, *L. reticulata*, and *L. striolata* are from specimens found in Australia, and the remaining one, *L. natans*, Mr. Rousselet states, was found near London once only. This species is, however, extremely plentiful in Victoria, and has been found plentifully near Brisbane. Of these species two, *L. elliptica* and *L. elongata*, were recorded later from South Africa and France respectively. This still leaves five species unknown outside Australia. All these eight species of *Lacinularia* are colonial forms, and are therefore conspicuous and easily found, the smallest clusters being discoverable by the naked eye, while two, *L. pedunculata* and *L. striolata*, form clusters of thousands of individuals, and are objects as readily discernible as a fallen wattle flower, and a third, *L. reticulata*, occurring as it does in colonies on the surface of the mud, has been seen in masses over a square inch in area.

Mr. Rousselet in his paper on the "Geographical Distribution of the Rotifera" states that "it is not possible to speak of any

typical or peculiar Rotatorian fauna for any continent, zone or region." I submit that in view of the facts now stated in regard to the genus *Lacinularia* and its mode of occurrence, this decision is premature. There can be no doubt that man's activities are efficient agencies for the distribution of rotifers, and may largely account for the wide diffusion of species now observed, but, if isolated occurrences of the five species described and recorded solely from Australia should be discovered, it seems reasonable to regard them as most probably due to those agencies.

As above stated, the forms are conspicuous, and besides all appear in enormous numbers at times. The free swimming colonies fill the pools, it being impossible to dip an ounce of water free from them. The method of development indicates adaptation to the peculiar climatic conditions. The resting eggs, having lain dormant throughout the summer in the dried mud in hollows, on the fall of rain in early winter develop simultaneously with the eggs of other animal and vegetable organisms. Generally, the plant forms are the first to mature, and thus a supply of food is ready for the swarms of minute animals which follow. The early part of the wet season is the time when in a given pool a particular species often predominates almost to the exclusion of all others. This is specially noticeable in the five species, *L. elliptica*, *L. elongata*, *L. striolata*, *L. natans*, and *L. reticulata*.

*L. striolata* practises a unique method of multiplication of colonies, which strongly suggests a special adaptation to the environment. The clusters are sedentary, being attached by a peduncle to aquatic plants, and a single colony may consist of thousands of individuals. The growth of the colonies in this species is not due to successive generations of individuals taking their places in the colonies alongside their parents. The method is as follows: After the rain forms a pool the resting eggs of the previous season germinate, and give rise to free swimming individuals, which come together and form small colonies. Immediately in these colonies, the individual members of which are all females, parthogenetic eggs appear, and hatching out in the gelatinous nidus, the newborn rotifers swim away and combine with similar forms from other colonies to form a new cluster; thus a colony consists only of the animals which initiate it, and the colonies become successively larger as the increase in number goes on. This swarming process goes on until the food supply



is exhausted, and at this stage males appear, followed by the formation of resting and presumably sexual ova, these latter being destined to endure throughout the summer until another rainy season again originates the process.

In view of these facts of adaptation to the special conditions of the Australian climate, the so-far exclusive occurrence of the majority of species of one genus, and the methods of multiplication of so peculiar a character, it seems too hasty to assume that rotifers are entirely cosmopolitan in their distribution. At least it must be granted that there are indications of an approach to an indigenous character such as strongly marks the general flora and fauna of this continent.